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Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

Daniel S. Greenbaum
Commissioner

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Policy for Discharges to Groundwater in Support of Remedial Actions Conducted in Accordance with M.G.L. c. 21E

Policy #DEP-91-001

The attached policy clarifies requirements and procedures for discharges to groundwater in support of remedial actions conducted in accordance with Massachusetts General Law chapter 21E and the Massachusetts Contingency Plan. It contains information on permitting and approvals, and explains the roles and responsibilities of both the Bureau of Waste Site Cleanup and the Bureau of Resource Protection/Division of Water Pollution Control in authorizing remedial action discharges and termination of groundwater treatment.

This policy also contains interim guidance to assist DEP staff and the regulated community in evaluating the feasibility of achieving remedial action goals with existing groundwater treatment systems. The interim guidelines are issued as of the date below for a six-month evaluation period. The interim guidelines will be superseded at the conclusion of the evaluation period by a final version for use by DEP staff and the regulated community. Final authorization to terminate treatment based on the interim guidelines may be delayed until after the conclusion of the evaluation period.

The Department welcomes comments from the regulated community to assist in its evaluation of the attached interim guidelines.

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1.0 Background and Purpose

Under Massachusetts General Law chapter 21E, the Department of Environmental Protection (DEP) is responsible for establishing procedures for the protection of health, safety, public welfare and the environment from releases of oil and hazardous material. Remedial response actions at sites where releases of oil and hazardous materials to the environment have occurred frequently require treatment of groundwater to reduce contaminant concentrations to acceptable levels. The treated groundwater is often reinjected back into the aquifer, in accordance with applicable groundwater discharge permit requirements.

In some cases, it is possible that the best available groundwater treatment technologies may not be capable of attaining the level of contaminant reduction required to achieve groundwater quality standards or other appropriate remedial goals. In these cases, the operation of approved groundwater reclamation and treatment systems may continue indefinitely with little or no net benefit to the environment. The Department must evaluate the technical feasibility of continued groundwater remediation, both in terms of the remedial goal and the economic cost of achieving that level of restoration.

This policy clarifies the regulatory and procedural requirements for discharges to groundwater in support of remedial actions conducted in accordance with M.G.L. c. 21E and the Massachusetts Contingency Plan (310 CMR 40.00, the "MCP"), and their relationship to groundwater discharge permit requirements issued under M.G.L. c. 21 and 314 CMR 5.00. It also describes how feasibility evaluations for existing groundwater treatment systems will be incorporated into remedial actions conducted under M.G.L. c. 21E and the MCP.

2.0 Applicability

This policy applies to all discharges to groundwater in support of remedial actions conducted in accordance with the requirements of M.G.L. c. 21E and the MCP.

The policies and procedures established in this document are intended solely for guidance. They are not intended and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in any administrative or judicial proceeding with the Commonwealth.

3.0 Regulatory Framework

The Department's Bureau of Resource Protection/Division of Water Pollution Control is responsible for permitting discharges to groundwater in accordance with the requirements of M.G.L. c. 21 and the Ground Water Discharge Permit regulations (314 CMR 5.00). These discharges must be demonstrated to meet effluent limitation standards corresponding to the appropriate groundwater classification assigned to the area for which they are proposed,

as well as other requirements intended to prevent degradation of the environment through improper system operation or inadequate system design.

The Department's Bureau of Waste Site Cleanup is responsible for oversight of remedial actions conducted in response to releases of oil and hazardous material into the environment, in accordance with the requirements of M.G.L. c. 21E and the MCP. These remedial responses frequently employ "pump and treat" technologies, whereby groundwater is pumped to the surface, treated to remove contaminants, and reinjected into the ground. In most cases, this reinjection of treated groundwater is subject to the requirements of the ground water discharge permit regulations, as well as applicable MCP requirements.

4.0 Authorization

Discharges to groundwater in support of remedial response actions conducted under M.G.L. c. 21E may only be commenced under the following conditions:

a. upon receipt of a Groundwater Discharge Permit issued by the Department in accordance with 314 CMR 5.00; or

b. upon receipt of a written letter of authorization from the Bureau of Waste Site Cleanup Regional Engineer or his designee in the appropriate regional office, to proceed with a discharge that is necessary to abate an imminent hazard to the public health or safety.

5.0 Termination of Groundwater Treatment

If groundwater discharge is authorized in response to an imminent hazard, termination of treatment and discharge may be authorized by the Bureau of Waste Site Cleanup based on a satisfactory demonstration that the imminent hazard has been eliminated and is not likely to recur following termination of groundwater treatment.

Permitted groundwater remediation projects operated in accordance with the requirements of M.G.L. c. 21E will be required to be operated until termination is authorized in writing by the Bureau of Waste Site Cleanup. Authorization to terminate groundwater treatment will be based on a satisfactory demonstration that:

a. the influent and the effluent of the treatment system as well as all of the applicable groundwater monitoring wells meet the applicable groundwater quality standard in 314 CMR 6.00, or other appropriate remedial action goals; or

b. attainment of the appropriate remedial action goals in the influent and monitoring well network is not feasible, based on criteria established by the Department; and the system has achieved the maximum degree of remediation that is feasible.

Demonstration of the infeasibility of attaining groundwater standards or other appropriate remedial action goals shall be based on criteria published by the Department in the document entitled "Interim Guidelines for the Evaluation of a Showing of Infeasibility of Groundwater Remediation", included as Appendix A of this policy. In addition, persons requesting a determination of a showing of infeasibility will be required to acknowledge in writing the Supplemental Conditions for a Showing of Infeasibility contained in Appendix B of this policy. In all cases, system operators will be required to notify the Division of Water Pollution Control in writing upon termination of the operation of permitted groundwater remediation systems.

6.0 Relationship to Other Remedial Requirements

Departmental approval of a showing of infeasibility and authorization to cease operation of the groundwater remediation system discharge for which the permit is written shall not be considered a determination that a "permanent solution" as defined by M.G.L. c. 21E has been reached, and shall not relieve the permittee from complying with any future remediation efforts required by the Department. At a minimum, designated monitoring wells shall be sampled quarterly for a period of one year for the contaminants which were identified at the site, both to ensure that shutdown of the system does not result in the migration of unacceptable contaminant concentrations towards sensitive receptors, and to confirm whether natural attenuation of remaining contaminant levels is occurring.

Appendix A

Interim Guidelines for the Evaluation of a Showing of Infeasibility of Groundwater Remediation

The Department has established the following guidance in order to evaluate the appropriateness of continuing to operate a treatment system for an extended period of time which may result in unwarranted economic obligations to the responsible party that outweigh the environmental and public health benefit of meeting the applicable standards. This guidance is issued on an interim basis, and will be evaluated and revised by the Department as appropriate.

In evaluating whether a potentially responsible party has demonstrated to the Department's satisfaction the infeasibility of continuing to operate the existing permitted treatment system to achieve the applicable groundwater quality standards or other remedial goals, the Department will apply the following criteria established jointly by the Division of Water Pollution Control and the Bureau of Waste Site Cleanup.

The Department will recognize and approve a showing of infeasibility provided that:

a. water quality data obtained from the influent and applicable monitoring wells, and analyzed by a laboratory certified by the Department for the constituents of concern, demonstrates that a significant reduction of the concentration of each contaminant in groundwater has been achieved in the area of remediation; and

b. the data gathered at quarterly intervals over a twelve month period demonstrates that the concentrations of each contaminant have stabilized; and

c. the approved treatment system(s) are reasonably incapable of further remediation to achieve applicable groundwater quality criteria.

In its evaluation of the required monitoring data to determine whether the concentrations of contaminants have "stabilized", the Department will consider that the graph of contaminant concentration versus time fits a curve generally defined by the equation $C=C_f+C_o e^{-kt}$, that the lower limb of the curve is substantially linear, and that the slope of the final portion of the curve approaches zero.

Appropriate x and y axes scales will be assigned to minimize data distortion and appropriate statistical methods will be applied to demonstrate this conclusion.

In the above equation, the symbols are defined as follows:

a. C: Contaminant concentration at time t;

b. C_f: Coefficient representing final concentration which the curve approaches asymptotically;

c. C_o: Coefficient representing concentration difference between the final concentration and the concentration at time zero;

d. e: 2.710, the base of natural logarithms;

e. k: Coefficient representing exponential factor which indicates how fast concentration approaches C_f;

f. t: Time in days from some fixed starting point;

The submitted groundwater quality data may be supplemented by additional data showing that ambient conditions within the general area of the disposal site exceed applicable environmental standards, and that the permitted system will therefore be unable to achieve the applicable standards at the disposal site. Such information will be taken into account by the Department in determining whether a showing of infeasibility has been made.

Appendix B

Supplemental Conditions for a Showing of Infeasibility

The applicant understands that remedial response actions are required to result in a permanent solution that, at a minimum, will ensure the attainment of a level of control of each identified substance of concern at the disposal site such that no such substance of concern will present a significant or otherwise unacceptable risk of harm to health, safety, public welfare or the environment during any foreseeable period of time.

Departmental approval of a showing of infeasibility and authorization to cease operation of the groundwater remediation system discharge for which this permit is written shall not be considered a determination that a "permanent solution" as defined by M.G.L. c. 21E has been reached, and shall not relieve the permittee from complying with any future remediation efforts required by the Department. The applicant acknowledges that additional actions may be required by the Department in order to ensure that a feasible permanent solution is achieved, in accordance with the provisions of M.G.L. chapter 21E and the Massachusetts Contingency Plan (310 CMR 40.00, the "MCP"), and agrees to comply with any additional requirements of M.G.L. chapter 21E and the MCP.